U.S. ARMY CORPS OF ENGINEERS
WALLA WALLA DISTRICT
FISH FACILITIES WEEKLY REPORT
#09-2016

Project: McNary
Biologist: Bobby Johnson and Denise Griffith
Dates: April 22 - 28, 2016

Turbine Operation

McNary had available 14 units (out of 14 total units) for power generation this week. Turbine unit outages are recorded in Table 1 below. The hard 1 percent peak efficiency constraint criteria began April 1. No turbine units ran outside the constraint this week.

Table 1. Unit Outages at McNary Project.

Units	Outage Dates	Outage Length	Reason
1 & 2	Apr 26	1.9 hours.	Bonneville Power Administration (BPA) transmission line outage.
3 & 4	Apr 26	1.3 hours.	BPA transmission line outage.
13 & 14	Apr 26	3.5 hours.	BPA transmission line outage.

Adult Fish Passage Facilities

The McNary fisheries biologist performed measured inspections of the adult fishways on April 25, 27 and 28. Fisheries technicians monitored the ladders as shifts allowed. Adult fish counts resumed April 1.

Fish Ladder Exits: The head over weir criteria at both exits are to be within 1.0 to 1.3 feet. The differential criteria at the count stations are to be within 0.0 to 0.5 feet. Both ladder exits met all criteria during measured inspections.

In the Washington exit area, debris loads were minimal to light. At the Oregon exit, debris loads were minimal. The count station window cleaning brush failed on April 27 and was repaired the next day.

Oregon exit traveling screen differential monitoring revealed no problems.

Fishway Entrances and Collection Channel: Criteria for all entrances are pool differentials measuring between 1.0 and 2.0 feet, and weir depths measuring 8.0 feet or deeper.

At the Washington ladder, all inspection points were in criteria.

At the Oregon north powerhouse entrance, weirs NFEW 2 and NFEW3 measured 7.9 feet in depth on April 27. At the south powerhouse entrance, weir SFEW1 measured 7.9 feet in depth on April 25 and 27. Weir SFEW2 measured 7.9 feet in depth on April 27. Higher tailwater elevations possibly contributed to these readings. After the biologist inquired about the issue, the operators checked the weirs set points on April 28 and adjusted each set point 0.15 feet deeper. In addition, operators increased fish pumps blade angles by one degree.

All other Oregon ladder inspection points met criteria. However, on April 28, at 1602 hours, the north entrance weirs triggered multiple alarms. The operator switched the entrances to manual mode in order to maintain criteria. After rebooting the entrance program logic controller (PLC), the entrance was returned to automatic mode.

Collection channel surface velocities averaged 1.6 feet per second.

Auxiliary Water Supply System: The Wasco County Public Utility District (PUD) turbine unit in the Washington ladder remains out of service for runner replacement, which has been delayed to an undetermined date. The bypass continues to function satisfactorily.

Two of the three Oregon ladder fish pumps operated satisfactorily with two interruptions in service this week. On April 26, from 1357 to 1551 hours, the pumps were out of service in support of the BPA transmission line outage mentioned in Table 1 above. On April 28, fish pump 3 tripped off line for six minutes during a raw cooling water test. Both pumps operated with blade angles of 25 to 26 degrees. Fish pump 2 is currently under contract for major overhaul with completion scheduled for September 2016. The overhaul contractor returned to the project on April 25.

The juvenile facility continues to supply 450 cubic feet per second (cfs) to the north powerhouse pool.

Juvenile Fish Passage Facility

The fish passage season consists of alternating days of primary and secondary bypass modes. The switch occurs every morning at 0700 hours. There were no deviations in the schedule. Secondary bypass occurred on April 22, 24, 26 and 28. This week, 2,200 juvenile lamprey and 303,133 smolts were bypassed.

On April 26, from 1414 to 1430 hours and from 1525 to 1535 hours, the juvenile facility was without power due to the BPA transmission line outage mentioned in Table 1 above. The sample gates were off during the outages. One sample was missed at a 0.5 percent sample rate.

Forebay Debris/Gatewell Debris/Oil: Forebay debris loads remained heavy, consisting mostly of woody material. The quantity of new incoming debris along the powerhouse remained light. Some debris is going over the top spillway weirs (TSWs). Operators continued to flush a large number of tumbleweeds through the navigation lock as needed. A light debris load also formed along the spillway.

No high trash rack differential measurements were recorded this week.

No problems were observed in the gatewell slots.

Extended-length submersible bar screens (ESBSs)/Vertical Barrier Screen (VBSs): ESBSs are deployed in all units. ESBS camera inspections will begin on May 10. The ESBS in slot 12C remains in timer mode. Efforts to return the brush cycle to automatic mode failed on April 28. ESBSs in units 1 and 5 were tested in timer mode during the week.

VBS differential monitoring revealed no screens out of criteria. However, the screens in slots 1A and 5B were cleaned on April 28. One smolt and two fry mortalities were noted. VBS rehabilitations continued.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: Forty two orifices were in use. During VBS cleaning, orifices in the affected slots were closed, with makeup water coming from orifices in adjacent slots. Orifice valve actuator rehabilitations were completed this week.

All systems functioned satisfactory in automatic mode.

On April 28, a juvenile clipped steelhead was found on the side screen brush access platform. On May 2, a jump barrier will be installed around the platform base.

Bypass Facility: During the bypass season, primary and secondary bypass modes return all fish are to the river. Passive integrated transponder (PIT) tag detection occurs in the full flow pipe during primary bypass and throughout the facility during secondary bypass. Smolt monitoring occurs only on secondary bypass days.

The sample gates are turned on and off every other day so that they are in service only during secondary bypass. The sample gates were off during the power outages mentioned above in the Juvenile Section introduction. The sample gates and all operational systems functioned well. The PIT tag sample gates remained turned off. The facility bypass lines provide a superior route for the fish over the PIT tag sample release lines downstream of the PIT tag sample gates.

River Conditions

River condition data during the week was provided by the smolt monitoring staff and is outlined in Table 2 below. The data period runs from 0700 to 0700 hours each day. Flows and spill are recorded in one-thousand cubic feet per second. Temperatures are recorded in degrees Fahrenheit.

Routine spring spill in support of fish passage continued with both TSWs in place and operating. Forty percent of river flow is spilled in the spring season. This week, due to flow in excess of powerhouse capacity, 43 to 51 percent of flow was spilled.

Table 2. River Conditions at McNary Dam.

Daily Average River Flow		Daily Average Spill		Water Temperature (Unit 1 scroll case)		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
354.1	304.4	180.6	131.6	52.4	51.5	6.0	5.3

Other

Inline Cooling Water Strainers: The next cooling water strainer examinations will occur May 3.

Invasive Species: The next mussel station examinations will occur on April 29.

Avian Activity: Avian counts are recorded in Table 3 below.

Table 3. McNary Project's Daily Avian Count.

Date	Zone	Gull	Cormorant	Tern	Pelican	Grebe
Apr 22	Forebay	0	0	0	0	0
	Spill	57	0	0	0	0
	Powerhouse	0	0	0	0	0
	Outfall	15	0	0	0	0
Apr 23	Forebay	4	1	0	0	1
	Spill	67	0	0	0	0
	Powerhouse	0	0	0	0	0
	Outfall	37	0	0	0	0
Apr 24	Forebay	3	0	0	3	0
	Spill	71	0	0	0	0
	Powerhouse	0	0	0	0	0
	Outfall	11	0	0	0	0
Apr 25	Forebay	58	0	0	1	15
	Spill	85	0	0	0	0
	Powerhouse	0	0	0	0	0
	Outfall	17	0	0	0	0
Apr 26	Forebay	20	0	0	0	0
	Spill	32	1	0	0	0
	Powerhouse	0	0	0	0	0
	Outfall	21	0	0	0	0
Apr 27	Forebay	6	0	0	0	1
	Spill	36	2	0	0	0
	Powerhouse	2	0	0	0	0
	Outfall	0	0	0	0	0
Apr 28	Forebay	8	0	0	0	0
	Spill	58	2	0	0	0
	Powerhouse	10	0	0	0	0
	Outfall	0	0	0	0	0

Gulls were observed feeding in the spill zone. Most gulls at the bypass outfall were unsuccessful. The inverted sprinklers at the outfall appear to be affecting feeding patterns. Most birds observed in the other zones appeared to be roosting. Ospreys and loons were noted at times. Gulls, pelicans and cormorants were roosting on the rocks by the Washington shore boat dock, which is outside the forebay zone.

United States Department of Agriculture – Animal and Plant Health Inspection Service – Wildlife Services (USDA–APHIS–WS) hazing personnel continued two shifts and boat hazing three days a week.

The bypass outfall sprinklers have been functioning satisfactory. The sprinklers supply pump intake is being cleaned twice a week. After each power outage mentioned above (in the Juvenile Section of this report), the outfall sprinklers pump regained prime in about 20 minutes.

Research: Gas bubble trauma (GBT) monitoring continues with monitoring occurring twice a week during the spill season. The 100 smolts examined on April 22 were not included in the facility system data due to an upload failure of GBT.net. There were 82 yearling Chinook and 18 steelhead smolts examined.

A United States Geological Survey fisheries biologist conducted non-lethal smolt stomach content examinations on April 27. Forty yearling Chinook smolts, ten of which were unclipped, were examined.

Project: Ice Harbor
Biologist: Ken Fone
Dates: April 22 - 28, 2016

Turbine Operation

Unit 5 was taken out of service on March 14 at 1117 hours, due to an oil leak from the blade packing. The packing is being replaced to fix the leak. Unit 2 was taken out of service on April 25 at 0606 hours to prepare the unit for runner replacement. Operational testing of unit 2, with the STSs installed and operating normally, occurred from 0846 hours to 1459 hours on April 27 and from 0458 hours to 1152 hours on April 28, as part of the runner replacement contract.

Units are being operated within the 1% operating efficiency range (hard constraint). Unit 2 was operated outside of the 1% peak efficiency range for most of the testing period to accommodate evaluation needs.

Adult Fish Passage Facilities

Fish facility personnel inspected the adult fishways on April 25, 26, and 27.

Fish Ladders: The north fish ladder inspection areas (head differentials at fishway exit and picketed leads, and depth over weirs) were in criteria on all inspections. The south fish ladder inspection areas (head differentials at fishway exit and picketed leads, and depth over weirs) were in criteria on all inspections. Criteria for head differentials at ladder exits and picketed leads, and depth over the weirs are 0.5 feet or less, 0.3 feet or less, and 1.0 - 1.3 feet, respectively. The water surface above the fish ladder exits were clear of debris and the bubblers were operating satisfactorily.

Fishway Entrances and Collection Channel: The south shore entrance (SFE-1) depth and channel/tailwater head differential were in criteria on all inspections. The north powerhouse entrance (NFE-2) depth and channel/tailwater head differential were in criteria on all inspections. The north shore entrance (NSE-1) depth and channel/tailwater head differential were in criteria on all inspections. Fishway entrance criteria are 8 feet depth or greater, or on sill. Channel/tailwater differential criteria are 1 – 2 feet.

The south shore channel velocity was in criteria. The channel velocity criterion is 1.5-4.0 feet/second.

Auxiliary Water Supply (AWS) System: Two of the three north shore AWS pumps were operated during the week. Six of the eight south shore AWS pumps were operated throughout the week.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: There was no debris observed in the forebay. The surface debris coverage in each gatewell slot ranged from 0% to 13%. Oil sheens were observed in 5A and 5C gatewell slots during the week. Oil absorbent pads were in the slots. The sheens were residual oil from the unit 5 blade packing oil leak. The maintenance bulkhead is installed in gatewell slot 5B and the slot is unwatered to reduce the water leakage into unit 5.

STSs/VBSs: The STSs are operating in cycle run mode. The STS for slot 5B has not yet been installed to facilitate the work on unit 5. Units 1, 2, 3, 4, and 6 STSs were inspected on April 19 and 20. There were no problems found.

Orifices, Collection Channel, Dewatering Structure, and Bypass Pipe: The juvenile fish bypass is operating with 20 orifices open. The orifices in unit 5 gatewell slots have been closed since the start of the season, because unit 5 has been out of service. The avian abatement hydrocannon at the end of the outfall pipe has been out of service this season due to a leaking expansion joint in the hydrocannon water line. A replacement expansion joint is being ordered.

Juvenile Fish Facility: The juvenile fish facility is operating in bypass mode except when collecting fish for the sample.

Fish Sampling: Fish sampling occurs twice a week, on Mondays and Thursdays. Sampling results are contained in Table 1 below.

Table 1. Fish condition sampling results at Ice Harbor Dam (continued on the next page).

April 25:

Species	Sampled	#Descaled	Morts	Avian Marks
C-CH	60	0	0	0
UC-CH	23	0	0	0
C-CH-O	0	---	---	---
UC-CH-O	0	---	---	---
C-SH	32	0	0	0
UC-SH	7	0	0	0
C-COHO	0	---	---	---
UC-COHO	0	---	---	---
C-SOCK	0	---	---	---
UC-SOCK	0	---	---	---
TOTAL	122	0	0	0

April 28:

Species	Sampled	#Descaled	Morts	Avian Marks
C-CH	55	1	0	1
UC-CH	17	1	0	0
C-CH-O	0	---	---	---
UC-CH-O	0	---	---	---
C-SH	57	1	0	2
UC-SH	4	0	0	0
C-COHO	0	---	---	---
UC-COHO	0	---	---	---
C-SOCK	0	---	---	---
UC-SOCK	0	---	---	---
TOTAL	133	3	0	3

Removable Spillway Weir: Spill for fish passage began on April 3 at midnight. The RSW is operating normally.

River Conditions

River conditions during the week are outlined in Table 2 below.

Table 2. River conditions at Ice Harbor Dam.

Daily Average River Flow (kcfs)		Daily Average Spill (kcfs)		Water Temperature* (^{o}F)		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
132.4	104.1	86.3	66.6	53.0	53.0	6.2	6.2

*Unit 1 scroll case temperature.

Other

Inline Cooling Water Strainers: Monthly turbine cooling water strainer inspections occurred on April 19 and 20. A total of 1 unclipped juvenile Chinook and 4 juvenile lamprey (all mortalities) were found.

Invasive Species: No new exotic species have been found.

Avian Activity: The numbers of gulls, cormorants, and pelicans observed around the project (Table 3 below) fluctuated during the week, but remained relatively high. Most of the pelicans were observed on Eagle Island, while most of the gulls were observed foraging in the stilling basin adjacent to/downstream of the navigation coffer cells when the hazing boat was not present. Beginning April 1, contracted land-based hazing of piscivorous birds occurred for 8 hours per day, changing to 16 hours per day starting on April 10. Boat-based hazing began on April 10 for 8 hours per day, 3 days per week, changing to 5 days per week beginning on April 24. Land-based hazing was generally effective at keeping birds out of the zones immediately

adjacent to the dam, including the fish bypass outfall pipe. Boat-based hazing was effective at scaring birds out of the stilling basin.

Table 3. Daily maximum piscivorous bird counts at Ice Harbor Dam.

Date	Gulls	Cormorants	Caspian Terns	Grebes	Pelicans
April 22	11	19	0	1	43
April 23	16	14	0	0	66
April 24	20	45	0	0	30
April 25	44	16	0	0	33
April 26	35	18	0	0	0
April 27	36	25	0	0	1
April 28	29	36	0	0	6

Research: Beginning on April 21, tissue samples were taken weekly from clipped juvenile Chinook by NOAA Fisheries researchers to study the relationship of the physiological condition of smolts and the incidence of delayed mortality of Chinook.

Project: Lower Monumental
Biologists: Bill Spurgeon and Raymond Addis
Dates: April 22 - 28, 2016

Turbine Operation

The units are being operated within the hard constraint 1% peak efficiency criteria. Unit 1 was removed from service on December 10, 2014 for unit rehabilitation with an estimated return to service date of January 12, 2017.

Adult Fish Passage Facility

The adult fishway was inspected by Corps and Anchor QEA biologists on April 22, 23, 24, 27 and 28.

Fish Ladders: Fishway exit head differentials and depths over the weirs were within criteria (≤ 0.5' and 1.0'-1.3', respectively) on all inspections. Picketed lead head differentials were in criteria (≤ 0.4' and ≤ 0.3' for north and south shore fishways, respectively) on all inspections.

Fishway Entrances and Collection Channel: NSE1 and NSE2 weir gates were in depth criteria (criteria: ≥ 8' or on sill) on all inspections. North shore channel/tailwater head was in criteria (1'-2') on all inspections.

SPE1 and SPE2 weir gates were in depth criteria (criteria: ≥ 8' or on sill) on all inspections. South powerhouse channel/tailwater head was in criteria (1'-2') on all inspections.

SSE1 weir gate was in depth criteria (criteria: ≥ 8' or on sill) on all inspections.

SSE2 was in criteria (6' above sill) on all inspections. South shore channel/tailwater head was in criteria (1'-2') on all inspections.

Auxiliary Water Supply System: AWS pumps 2 and 3 were operated throughout this period. Pump 1 was out of service throughout this period and will be out of service throughout this season unless an emergency occurs. This unit has a bushing problem.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: There was an average of 8 square yards of forebay debris observed during this period. Gatewell debris ranged from 0-30% surface coverage. Debris was removed from gatewells on 28 April. No oil problems observed in gatewells.

STSs/VBSs: STSs are operating in cycle run mode. STS inspections are scheduled for May 3-5.

Orifices, Collection Channel, Dewatering Structure, Flume: The collection channel was operated with 20 orifices open.

Collection Facility: Alternate day twenty-four hour condition sampling began on April 15.

Transport Summary: Collection for transport will begin May 1 at 0700 hours.

River Conditions

Routine spring spill operations in support of fish passage was initiated at 0001 hours on April 3. There was no spill on 25 April from 1330 to 1355 hours to allow boat access for the lowering of the dolphin mooring bit upstream of the barge dock. River conditions during the week are outlined in Table 1 below.

Table 1. River conditions at Lower Monumental Dam.

Daily Average River Flow (kcfs)		Daily Average Spill (kcfs)		Water Temperature (^{o}F)*		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
122.8	98.8	30.4	25.9	54.0	52.0	3.8	2.6

*Scrollcase temperatures.

Other

Inline Cooling Water Strainers: Cooling water strainers were inspected on April 5. There were no live fish recovered. Mortalities included 51 juvenile lamprey.

Invasive Species: No zebra mussels were observed during monitoring station inspections on April 1.

Avian Activity: Daily tailrace counts of feeding piscivorous birds are summarized in Table 2 below. Gulls were the dominant species observed during inspections this week. Hazing met the standard from the avian action plan through this time period.

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Table 2. Daily maximum piscivorous bird counts at Lower Monumental Dam.

Date	Time	Gulls	Cormorants	CaspianTerns	Grebes	Pelican
April 22	1105	9	0	0	0	0
April 23	1100	7	0	0	0	0
April 24	1120	0	0	0	0	0
April 25	1100	0	0	0	0	0
April 26	1100	7	0	0	0	0
April 27	1100	9	0	0	0	0
April 28	1100	13	0	0	0	0

Research: No onsite research is in progress at this time.

Project: Little Goose
Biologist: Richard Weis
Dates: April 22 - 28, 2016

Turbine Operation

All turbine units were available for service this week. Hard constraint 1% peak efficiency criteria are in effect. No violations to report. Two brief outages occurred for brush cleaner service on fish screens. Fish screen 3C was pulled for brush cleaner repairs on April 22. Unit 3 was out of service from 0700 to 1400 hours in support of these repairs. Fish screen 5A was out of service for two hours due to a faulty brush motor on April 23.

Adult Fish Passage Facility

The new Fishway Control System still does not work properly. This system will be in manual until repairs can be made.

Adult fishway inspections were performed on April 25, 26 and 28.

Fish Ladder: The ladder exit head differentials held steady at 0.0 feet (criteria $\leq$ 0.5 ft.). Water depths over the weirs held steady at 1.1 feet (criteria 1.0-1.3 ft.) and picketed lead differentials ranged between 0.0 and 0.1 feet (criteria $\leq$ 0.3 ft.). The air bubbler used to prevent debris from collecting near the ladder exit operated satisfactorily.

Fishway Entrances and Collection Channel: Channel to tailwater head differentials ranged between 1.0 and 1.6 feet (criteria 1.0 to 2.0 ft.). SSE weir depths ranged between 9.0 and 9.4 feet (criteria $\geq$ 8.0 ft). NPE weir depths ranged between 6.0 and 7.0 feet (criteria $\geq$7.0 ft.) and were on sill. NSE weir depths ranged between 6.0 to 6.2 feet (criteria $\geq$ 6.0 ft.) and were on sill. Collection channel surface water velocity measured at the North powerhouse ranged between 1.6 and 1.8 fps (criteria 1.5 to 4.0 fps).

Auxiliary Water Supply System: Fish pump 1 is still awaiting installation. The estimated repair date has been extended again and is now set for the end of May. Presently fish pump 2 and 3 are running. Water velocity measured at the North powerhouse using the Rickly velocity equipment was not conducted this week.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: The trash/shear boom is currently still on shore. Efforts are underway to have it repaired. Woody debris in the immediate forebay was estimated between 2,400 to 2,600 square feet.

Spillway Weir: The repair to spillbay 1 was completed by cannibalizing parts from spillbay 5 and a special spill pattern was approved. The TSW (Top Spillway Weir) is operating in the low crest position.

ESBS/VBS: Drawdown tests were performed on units 1-4 on April 26.

Orifices, Collection Channel, Dewatering Structure, and Flume: The juvenile bypass system is presently running with 22 open orifices in secondary by-pass mode.

Transportation Facility: Sampling commenced on odd numbered days on Saturday April 09. The JFF (Juvenile Fish Facility) is presently running in secondary by-pass.

Transport Summary: The collection and transportation facility operated within criteria this report period. A total of 1,218,983 fish were collected for bypassed for just 4 days of sampling. The descaling and mortality rates were 0.3% and 0.0% respectively. This weekly report period saw 0 adult lamprey removed from sample and released in the tailrace. Fish transport is to begin May 02. Collection for transportation begins May 01.

River Conditions

River conditions during the week are outlined in Table 1.

Table 1. River conditions at Little Goose Dam.

Daily Average River Flow (kcfs)		Daily Average Spill (kcfs)		Water Temperature* (^{o}F)		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
124.1	101.0	38.1	30.4	53.3	51.8	4.0	2.8

*Ladder temperature.

Other

Inline Cooling Water Strainers: Cooling water strainers on all units were last inspected on April 17. A total of 22 juvenile lamprey mortalitiess were removed.

Invasive Species: The zebra mussel substrate monitor was inspection on April 28. No fish were seen.

Avian Activity: Bird counting and hazing commenced on April 01. See Table 2 below for count details for the week.

Table 2. Daily Avian Counts at Little Goose Dam, April 22 – 28, 2016.

Date	Time (hours)	Gulls	Cormorants	Caspian Terns	Pelicans
April 22	1100	67	13	0	0
April 23	1110	165	17	0	0
April 24	1530	196	11	0	0
April 25	1200	67	2	0	2
April 26	0740	90	9	0	0
April 27	1245	111	4	0	0
April 28	1100	124	6	0	0

*Bird counts are taken from a single observation, Forebay and Tailrace.

Research: The FGE (Fish Guidance Efficiency) emergency gate closure study is being conducted on units 2 and 3 for 2016.

Project: Lower Granite
Biologists: Elizabeth Holdren, Robert Horal
Dates: April 22 - 28, 2016

Turbine Operation

Units are being operated within the hard constraint 1% peak efficiency criteria. Unit 1 was removed from service at 0915 hours, April 12 for Kaplan blade linkage repair. Unit 1 is expected to return to service in February 2017. Units 2 - 6 were rotated out of service April 24 for ESBS inspections.

Adult Fish Passage Facility

The automatic fish ladder control system was upgraded during the winter maintenance outage. Automatic control system adjustments to trouble shoot internal functioning errors in the program are ongoing. Problems continue with the system tailrace elevation sensors and gate depth sensors readings being inconsistent with physical staff gauge readings. Entrance gates found out of criteria during ladder inspections due to fish ladder control system problems are manually adjusted to depth or sill criteria and left in hand mode until contractors make adjustments. Program changes were uploaded for NPE2 at 1508 hours on April 25 in response to the slack cables. NPE2 was operated in local (manual mode) to remove the slack from the cables. The contractor requested to leave the system in automatic mode with the exceptions of NPE2 for the remainder of the week to evaluate how the system is responding. Adult fish facilities were inspected by Corps or Anchor QEA biologists April 22, 23, 24, and 27.

Fish Ladder: Fish ladder exit head differential and depth over the weirs were in criteria (≤0.5' and 1.0-1.3', respectively) on all inspections. Picketed lead head differential was in criteria (≤ 0.3'). An average of about 0.75 square yards of debris was observed near the fish ladder exit.

Fish Ladder Entrances and Collection Channel: SSE1 and SSE2 weir gates were in depth criteria (criteria ≥8' or on sill) on all inspections. South shore channel/tailwater head was in criteria (criteria 1'-2') on all inspections.

NPE1 and NPE2 weir gates were in sill criteria (criteria ≥8' or on sill) on all inspections except for a 7.2 feet reading on April 27. This reading was due to the control system being set at 628.1 feet to prevent the gate cables from spooling. While on sill, the gate depths were 6.9', 6.9', and 7.5 feet.

North powerhouse channel/tailwater head differential was in criteria (criteria 1'-2') on all inspections.

NSE1 was in criteria (criteria ≥7' or on sill) on all inspections. NSE2 has been out of service since 2011 and remains set with a chain fall hoist in the closed position to improve channel/tailwater head differentials. North shore channel/tailwater head differential was in criteria (criteria 1'-2') on all inspections.

Fish have been found stranded on the North shore collection channel walkway due to the combination of increased river flows, the close proximity to the spill, and strong upstream winds. Mortalities included 1 clipped Chinook smolt and 36 sandrollers on April 22, and 15 sandrollers on April 23.

Collection Channel Velocity: The collection channel average velocity was in criteria (criteria 1.5-4.0 fps) on all inspections.

Auxiliary Water Supply System: The fish ladder is in two pump operation with AWS pumps 2 and 3 in service. Pump 1 is in standby mode pending bulkhead swap.

Fish Ladder Temperature Control System: N/A.

Juvenile Fish Passage Facility

Forebay Debris/Gatewell Debris/Oil: An approximate average of 13.8 square yards of debris was observed in the forebay this week.

ESBSs/VBSs: ESBSs were inspected April 24 and 25. No reportable issues were observed.

Orifices, Collection Channel, Dewatering Structure, Bypass Pipe: The collection channel is in operation with no problems reported. Orifices are being cycled every three hours.

Collection Facility: The collection facility is in secondary bypass mode. Daily condition sampling is occurring. IDFG continued collecting genetic samples from yearling Chinook and juvenile steelhead Monday through Friday. Fish were collected for the NOAA in river survival study on April 25 and 26. NMFS/UW collected a subsample of these fish on April 26.

Transport Summary: Although fish transport is not occurring at this time, routine fish collection for transport is slated to begin May 1.

River Conditions

Routine Spring spill in support of fish passage continues. Spill exceeded 20 kcfs on April 23-26 due to high river flow conditions. River conditions during the week are outlined in Table 1 below.

Table 1: River conditions at Lower Granite Dam.

Daily Average River Flow (kcfs)		Daily Average Spill (kcfs)		Water Temperature* (F^o)		Water Clarity (Secchi disk - feet)	
High	Low	High	Low	High	Low	High	Low
129.3	105.2	46.5	20.3	54.2	50.0	4.4	3.1

*Cooling water intake temperature.

Other

Inline Cooling Water Strainers: Unit cooling water strainer inspections are scheduled for late May.

Invasive Species: Zebra/quagga mussel substrate was inspected April 1. No organisms were found.

Avian Activity: Piscivorous bird counts began March 26 with observations being taken from the top of the navigation lock. Avian hazing started April 1. Daily piscivorous bird counts are summarized in Table 2 below.

Table 2. Daily piscivorous bird counts at Lower Granite Dam.

Date	Time (hours)	Gulls	Cormorants	Caspian Terns	Pelicans
April 22	1300	1	0	0	0
April 23	1043	0	0	0	0
April 24	1100	0	0	0	0
April 25	1414	8	0	0	0
April 26	---	---	---	---	---
April 27	1446	8	0	0	0
April 28	0921	5	0	0	1

GBT: Gas bubble trauma sampling occurred April 28. No signs of gas bubble trauma were seen.

Adult Fish Trap Operations: The trap sample rate was changed April 14 at 1400 hours to 27% daily trap rate M-F (19% overall). The adult trap diversion gate in the turnpool area is changed to the ladder passage position from 1400 hours Friday to 1300 hours Sunday to facilitate the sound vibration study.

Fish Rescue Operation: No fish rescues occurred this week.

Research

Idaho Department of Fish and Game (IDFG) Genetic Stock Identification: This study aims to enumerate and characterize natural production of yearling Chinook and juvenile steelhead above LGR with regards to age composition and genetic stock profiles. IDFG will sample Monday through Friday through mid-June with a goal of collecting 2,000-5,000 genetic samples from yearling Chinook and juvenile steelhead.

Nez Perce Tribe (NPT)/U. of Idaho (UI)/Columbia River Intertribal Fisheries Commission (CRITFC) – Kelt Study: NPT began steelhead kelt collection March 31. This research project investigates steelhead kelt physiology and endocrinology to evaluate the feasibility and success

of rehabilitating strategies. NPT will transport up to 150 kelts to Dworshak National Fish Hatchery as part of this study.

National Marine Fisheries Service (NMFS)-Monitoring the Migrations of Wild Snake River Spring/Summer Chinook: This study is monitoring the migration behavior and survival of wild spring/summer Chinook salmon. The specific goals are to characterize the migration timing and estimate parr-to-smolt survival to LGR of wild Chinook populations as they migrate from their natal rearing areas and determine migration patterns and what environmental factors influence those patterns. Fish were PIT-tagged during the summer of 2015 in natal streams and are diverted to the Sort-By-Code tanks at LGR.

National Marine Fisheries Service (NMFS) In-River Survival: NMFS staff has begun PIT-tagging Chinook and steelhead smolts for their Survival Study to compare smolt to adult returns of in-river migrating smolts to the smolt to adult returns of transported smolts. PIT-tagged fish are held for 24 hours before being bypassed to the LGR tailrace.

Northwest Fisheries Science Center (NMFS) Columbia Basin Research University of Washington "Within-season indicators of fish condition related to differential delayed mortality" Smolt to Adult Survival Rates and Delayed Mortalities: NMFS are collecting out migrant juvenile spring-summer and yearling fall, subyearling Chinook for ongoing monitoring and research project. Staff condition sampling of fish use fourteen measurements related to energetic reserves, smoltification, and health indices. Weekly sampling will occur April 5 through July 26 and approximately monthly through October.

U.S. Geological Survey (USGS) "Describing the diet of migrating juvenile fall Chinook salmon": NMFS/University of Washington is collecting stomach contents through lavage or dissection from sacrificed fish for USGS for dietary evaluation. Up to 900 subyearling Chinook will be PIT tagged and release into the Lower Granite bypass facility to evaluate 8mm PIT tag detection efficiency.